使用本机之前，请先详读本手册，然后妥善保存以备将来参考之用。

Consumers Manual

Softstarter range

CHXL®

CHXL ELETRICAL

用户手册

HJR2000系列软起动器

CHXL®

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安全注意事项

警告！
只有专业技术人员允许安装HJR

警告！
必须保证电动机与HJR匹配合适，安装时，请务必按用户手册操作。

警告！
不允许将11、12端子输入380V

警告！
不允许将输入端（R、S、T）接到输出端（U、V、W）。

警告！
不允许软起动器输出端U、V、W线接电容器，否则会损坏起动器。

警告！
HJR安装后将输入和输出端的铜线鼻用绝缘胶带包好。

警告！
远程控制时必须锁定键盘控制。

警告！
软起动器和机器必须牢固接地。

警告！
维修设备时，必须断开进线电源。

警告！
不得私自进行拆装、维修本产品。

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安装准备

使用前请仔细阅读HJR安装说明。如果不认真阅读有关说明，违反有关安全规定，有可能影响软起动器的正常使用。

安装HJR请准备以下工具：螺丝刀、剥线钳、板钳等。

警告！
安装之前，请务必详细阅读“安全注意事项”。

使用及环境条件

【进线电源】 交流380V±15%（660V）50/60HZ
【控制电源】 交流220V±15% 50HZ 0.15A
【适用电机】 鼠笼式三相异步电动机
【起动频度】 每小时不超 过12次
【自然风冷】 自然风冷
【使用温度】 -30℃~55℃
【使用湿度】 90%无结霜
【使用场所】 室内无腐蚀性气体无导电尘埃通风良好
【标高振动】 海拔在3000米以下，振动力装置0.5G以下。

1、概述

交流鼠笼型异步电动机是应用最为广泛的用电设备。电机软起动器智能化技术的应用，使起动设备越来越具有稳合负载特性，对设备电网冲击小，工作性能稳定可靠。HJR系列全数字式软起动器，具有全面的工作状态LED显示功能，友好的人机对话界面，绿色环保型控制单元（KGL）功能范围覆盖5.5～500KW,广泛应用于冶金、化工、建筑、水泥、矿山、环保等所有领域的电动机传动设备，是传统的Y－△起动、电抗器起动、自耦降压起动理想的更新换代产品。

交流鼠笼型电动机软起动技术，在发达国家已应用多年，它成功地解决了交流电动机起动时造成的较大起动电流，对供电电压质量的影响和供电线路损耗增大以及对机械设备冲击等问题。

HJR系列全数字软起动控制器正是以先进的微处理器为核心，控制大功率晶闸组件，具有限流起动、电压斜坡起动、软停止功能，参数均可根据负载自行设定，并具有过流、过载、缺相等多种保护。软起动装置输出电压按设定规律上升，使受控电机转矩按优化的加速曲线完成启动过程后，关断晶闸管组件，由旁路交流接触器工作。

HJR系列软起动器功能

◆采用双单片机全数字自动控制;

◆起动转矩电流、电压、时间可按负载不同灵活设定，取得最佳的电流曲线和最佳的转矩控制特性;

◆对电动机提供了平滑的渐进的起动过程，减少起动电流对电网的冲击，降低设备的振动和噪声，延长了机械传动系统的使用寿命，并改善了工人的劳动环境;

◆启动电流可根据负载调整，减小启动损耗，以最小的电流产生最佳转矩；

◆软停车特性即大大延长电气触点之寿命，以满足不同场合下机械需求;

◆具有过流、过载、过热、电源缺相保护;

◆方便的外控接口具有多种功能：数字延时起动控制;瞬停控制输入;起动延时继电器输出;故障继电器输出;

◆对输入电源无相序要求;

◆可以自由停车和软停车，软停车时间可调节;

◆全数字设定和外控功能大大方便了用户;

◆自带标准的485接口（订货协议）;

◆0-20mA标准模拟电流输出;

◆产品结构新颖、体积小、性能可靠，安装、操作使用简便;

◆哈佛式单片机具有很强的抗干扰能力，保证控制系统不受强电干扰;

典型应用简介

◆水　　泵 ——利用泵控制功能，在起动和停止时，减少液流冲击所产生的泵流水锤现象，节省了系统维修费用;

◆球 磨 机——利用电压斜坡起动，减少齿轮转矩的磨损，减少维修工作量，即省了时间又节约了开支;

◆风　　机 ——利用软起动器取代传统起动器，减少皮带磨损和机械冲击，节省了维修费用;

◆压 缩 机 ——利用限流，实现了平滑起动，减少电动机发热，延长使用寿命;

◆破 碎 机 ——利用堵转保护和快速保护，避免机械故障或阻塞造成电动机过热而烧毁：

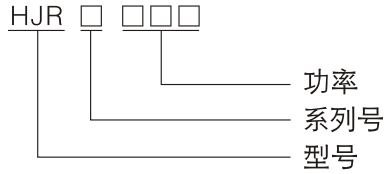
◆输送机械——利用软起动和预置低速运行，实现平滑的、渐进的起动过程，避免产品移位和液体溢出。

2、购入检查

开箱后进行下述检查：

(1)、检查铭牌以确认供货是你所订购的产品

(2)、软起动器型号



3、安装

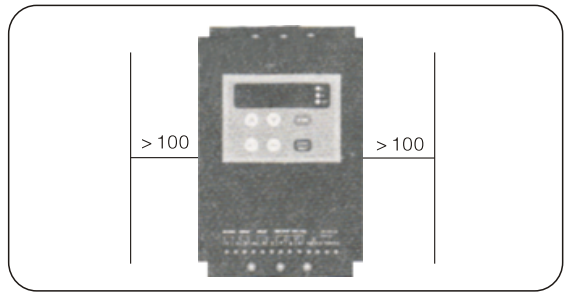
(1)、安全方向

为了冷却的目的，一定要将软起动模块安装在垂直方向。

(2)、安装空间

为了保证良好的散热性，软起动器安装时应有足够的空间。

(见图3.2)



(图3.2)

4、电路连接

(1)、主回路

端子标记	端子名称	说明
R S T	主回路电源端	连接主回路
U V W	起动器输出端	L21 L22 L23 连接旁路接触器上端 U、V、W连接电动机
E⏚	接地端	金属框架接地（防电击事故和干扰）

(2)、控制端子

端子序号	端子名称	说　　明
1 2	旁路继电器端子	可用于启动完毕后切换至旁路接触器
3 4	故障信号输出	故障时闭合（继电器触点输出）
5 6	运行信号输出	启动延时后接通（继电器触点输出）
7	瞬停输入端	与10断开时进入故障停机（无源）
8	软停输入端	与10断开时进入软停状态（无源）
9	启动输入端	与10接通时电机开始运行（无源）
10	公共接点输入端	接点输入信号的公共端
11	接地端	功能性接地
12 13	控制电源输入端	允许接入直流220V电源

注：输出继电器触点容量 AC 250V 5A

(3)控制电路端子连接

①按线准备

◆如用户使用外部端子时，用屏蔽控制线从端子排引出。

◆为避免电磁干扰，控制走线应避开电机电缆和其它强电回路。当不能避开时应与强电回路垂直交叉。

②外控端子的接线

◆起动完毕（旁路）继电器BY-PASS，端子1和端子2。参见图4.1

当起动过程完成时，内置触点便会闭合;使旁路接触器KM闭合。而停车指令发出时，内置触点便会打开。

触点容量为AC 250V 5A

建议：在接触器线圈上增加一组阻容有益于吸收分断时产生的电压尖峰，可减少对单片机的干扰。

◆故障信号 BREAKE,端子3，4

此内附触点为常开触点，故障时闭合。

技术参数 AC 250V 5A

◆联锁延时继电器 DELAY,端子 5，6

内附常开继电器触点，起动经延时0～240S后（由功能能码5设定）变为闭合。

技术参数 AC 250V 5A

◆瞬停输入 EMS，端子 7

属于外部故障信号输入，可用于外接热继电器等开关量的保护。运行中必须使此端子与端子10接通，断开时停机，用户可通过设定功能码6的值，设为0时，启用此端子功能，设为1时，可关闭此端子。

功能码7为1时，必须由面板按复位键，才能起动，功能码7设为0时，自动复位，EMS端子重新接通后即可起动。

◆三线控制方式端子8（STOP）端子9（RUN）端子10（COM）

此方式可用于外接开机、停机按钮。（参见图4.2）

功能码9需设为2或3才能选用此方式。

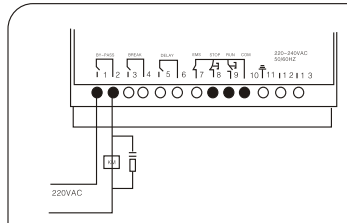


图4.1

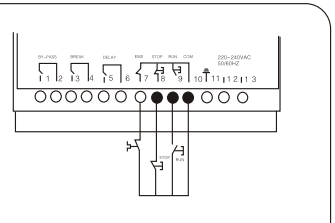


图4.2

◆两线控制方式

a.当用户需一个开关控制起动器的起停或通过PC、PLC控制时，选用此功能，J闭合软起动运行、断开停止、参见图4.3

b.功能9需设为2;

c.故障时除了用键盘复位，还可通过通断控制开关J来复位。

d.延时起动功能

在某些场合软起动器需延迟一段时间后起动，可选用此功能（功能码3设为延时值）;当9-10闭合后倒计时时间为零时，软起动器开始起动。

◆接地端子11

当安装板接地后，可就近接于安装板上。

90KW以上的装置，采用外壳接地，此端子可空置。

◆工作电源端子12、13

将N（中性线）连于端子13，L(相线)连于端子12（见图4.4）也可用一隔离变压器经主电路降压后获得。

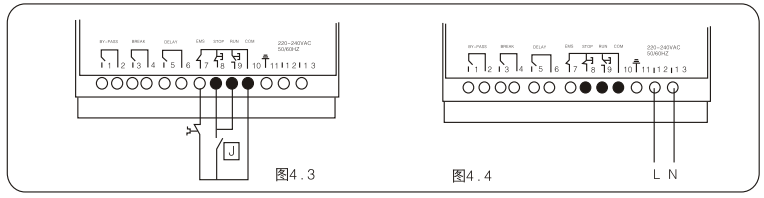


图4.3　　图4.4

※请检查你的工作电压是否正确

③通讯接与模拟电流信号输出0～20mA（参见图4.5.1）

◆标准485串口用于与上位PC机通讯，除了控制软起、停车，还可监控运行电流、故障状态等。

接口端子1：X1外引+5V

接口端子4：X4接受器的反相输入和驱动器的反相输出端（B）

接口端子5：X5信号地

接口端子6：X6接受器输入和驱动器输出（A）

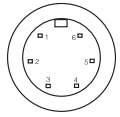


图4.5.1

提示：由此插座引出的导线应采用屏蔽线

1、5端接直流电压5V

2、3端为0～20mA输出

◆多机并行通讯时，子机最多可接30台。

◆最长通讯线距离可达1km。

◆DeviceNetBUS、ProfiBUS-DP总线另协议。

◆使用串口时应将功能码9设为4&5&6，功能码C设置为本机地址（1-30）。

◆0～20mA模拟电流信号输出。

485端子2：X2输出电流负极;485端子3：X3输出电流正极

此信号主要用于反映电机电流大小，传输给控制中心。

; 模拟电流信号与电机电流关系可用下式计算：

Y%=D/20×I×%　　Y：电机电流大小（%）

D:量程，130-当功能码A为1时，监测运行选用。

400-当功能码A为0时，监测起动选用。

④远程操作面板：可选取配远控操作面板，采取

485接口共有4根信号线：使用时接于图4.5.2插座上。

连线应采用屏蔽线

操作面板可与主板面板并行工作。

具有同样的功能

功能码9须设4&5&6。功能码C须设为1。

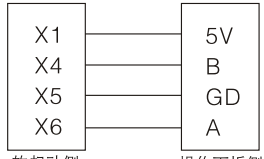


图4.5.2

(4)、主回路联接

软起动模块接线见图4.6，上端接入R、S、T（无相序要求）。如有E端必须牢固接地，下端U、V、W为输出端与电机边接，经试运转后，可通过换接R、S、T任两端或换接U、V、W任两端改变电机转向。

警告：

1、不允许将输入端子（R、S、T）接到输出端子U、V、W

2、不允许在输出端U、V、W线接电容，否则会损坏起动器。

3、必须保证接触器相序与软起动相序相同，否则软起动会接触闭合时，电源短路。

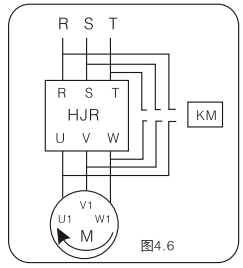
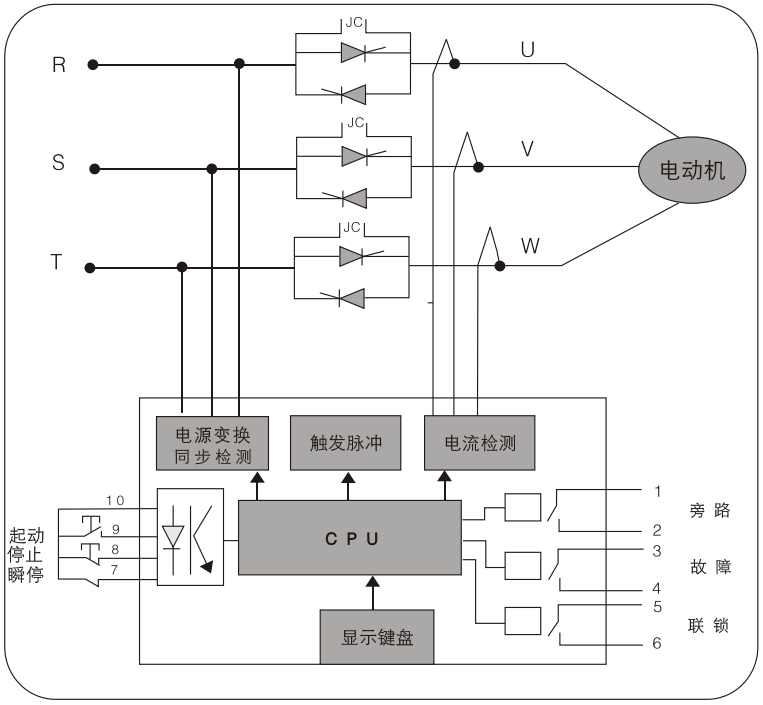


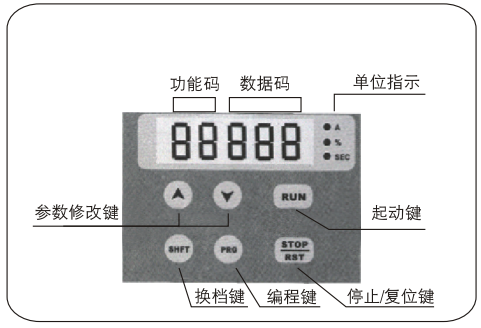
图4.6

(5)、基本电路框图和端子



5、键盘及显示说明

(1)、HJR系列起动器设有五位显示和六个控制按键，见下图：



RUN–起动键　在起动准备状态下按此键可使用电机起动。
STOP/RST – 停止/复位键　电机运行时按此键进入停车，编程状态或故障状态下按此键回到准备状态。
PRG – 编程键　准备状态下（显示READY）按此键进入予编程;数据修改后按此键保留此数据。
SHFT–换档键　编程时按此键修改数据或退出修改状态。
∧.V–　加减键　按入键　（或V键）增加（或减少）数据;持续按住∧键（或V键）数据改变加快。

(2)、显示说明

功能		设定范围	出厂值	说明
代码	名称			
0	起始电压	30～80%	30%	电压模式有效
1	上升时间	0～60S	10S	电压模式有效
2	软停车时间	0～60S	2S	设为0时自由停车
3	启动延时	0～240S	0S	两线方式有效
4	限制起动电流	150～500%	250%	限流模式有效
5	联锁延时	0～240S	0S	
6	瞬停设定	0～1	0	0：有　1：无
7	瞬停后再启动	0～1	0	0：允许　1：不允许
8	控制模式	0～1	1	0：限流　1：电压
9	控制方式	1～6	1	1：键盘　2：外控　3：键盘+外控 4：PC　5：PC+键盘　6：PC+外控
A	0～0.2mA 电流量程	0～1	0	0：满量程(20mA)对应400% 1：满量程(20mA)对应130%
B	显示方式	0～132	0	0：按额定电流百分比 XXX：选实际功率额定值
C	本机地址	1～30	0	用于串口通讯
D	修改设定参数	0～1	0	0：允许　1：不允许
E	过载倍数设定	50～200%	150%	额定值百分比
F	缺相保护	0～1	0	0：无　1：有
EY	修改设定保护	此状态下允许改变数据		
–A	起动上升状态	1.显示电流值XXXA或额定值百分比 2.延时起动时显示时间 DETTT		
–A	运行状态			
–A	软停车状态			

注：X为0～9数值　　Y为0～F数字
特别说明即使选用电压方式，限流亦是起作用，其限流值为400%

(3)、结构及工作原理

①结构类型：

具有限流电压斜坡起动方式，带LED显示两极，所有功能参数设定简便易行，身带标准Rs485接口中，可以与上位PC机通讯。可控制软起、软停车，也可监控运行电流及故障状态，还具有4～20mA模拟信号输出口，供控制中心监测电机运行电流，具有过流过载，电源缺相等在线保护功能，进出线方式为上三进三出，下三出接线，使接线简单方便。

②工作原理及特点：

HJR系列电动机软起动器采用SCR功率组件双单片机为控制核心的新型电动机设备，工作原理如下：（图为附图）

HJR系列电动机软起动器采用三对反并联的晶闸管串联于电动机三相供电电路上，利用晶闸管的电子 开关特性，通过控制其电压的大小，以达到控制电动机的软起过程。当电动机起动完成并达到额定电压，三相旁路接触器KM吸合，使电动机直接投入运行， 由于HJR系列电动机软起动器采用了双单片机控制，可根据负载特性任意设置各种起动参数，因此有较强的负载适应性。

6、数据的设定

(1)、如设置参数丢失时显示“-F 06”，可按以下操作恢复出厂数据。

①切断控制电源

②按住PRG键

③合上电源，放开PRG键所有设置参数被出厂值置换。

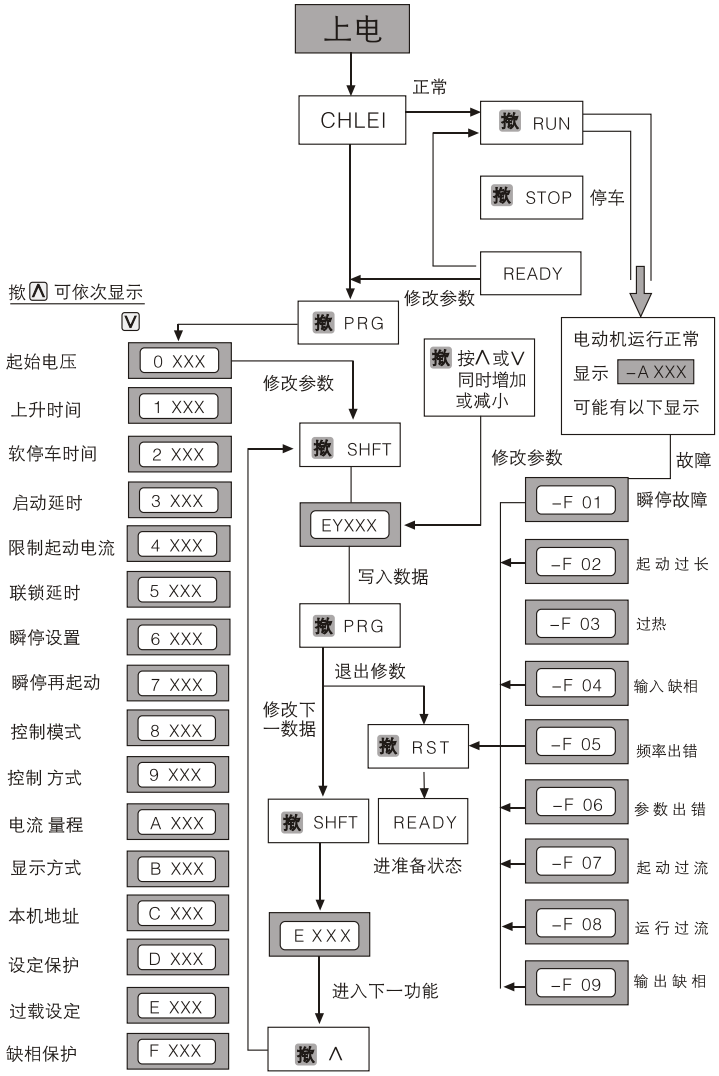
(2)、参数设定好后将一直保持到下一次 修改，不受掉电影响。

(3)、当软起动器出厂数据值不适合你的负载要求时，可按以下步骤操作（以修改起动限制电流和控制方式为例）

①操作步骤如下：

序 号	操　　作	显　　示	说　　明
1		CHLEI	开机 上电后的显示状态
		READY	复位后的准备显示状态
2	按PRG键	0 XXX	进入编程准备状态
3	按4次∧键	4250	出厂值250%
4	按SHFT键	E4250	进入修改参数状态
5	按∧键五次	E4300	参数增加
6	按PRG键	GOOD	保留新的数据
7	按SHFT键	4300	回到编程准备状态
8	按5次∧键	9　1	准备修改下一个数据
9	按SHFT键	E9　1	重复
10	按∧键一次	E9　2	重复
11	按PRG键	GOOD	重复
12	按STOP/RST键	READY	回到起动准备状态

②工作状态及操作框图



注：X表示0～9可以修改的数，Y表示0～F功能码。

7、通电运行

按上述完成连接后进行下述操作

(1)、试车

试车的主要目的是提供给用户确认电机转向和电机转动是否正常。

- ◆ 合进线断路器，正常时显示CHLEI
- ◆ 根据现场电机负载情况，合理调整软起动器各项参数，使电机转矩达到最佳状态。（参照附表二）
- ◆ 按RUN键同时观察电机转动方向是否符合要求，运转是否正常，如不正常，可按STOP键停机。
- ◆ 如电动机转矩不够，请增加起始电压值或限流值，提高电动机转矩。

(2)、运行

- ◆ 参考附表——设置参数。
- ◆ 按面板RUN键，（外控时用端子信号）起动器开始运行，电动机平稳加速电流无变说明参数设置合适。
- ◆ 运行后可按面板STOP键（或外控时用端子信号）执行停机。

8、保护显示说明

HJR系列软起器具有多种保护，任何故障均会停机，并显示故障码提示。

保护功能	面板显示	保　护　动　作
瞬停	-F 01	瞬停端子7对端子10开路
起动时间过长	-F 02	限流值太低使起动时间太长（大于60S）
过热	-F 03	起动过于频繁率，降低起动次数
输入缺相	-F 04	检查进线电源电机接线以及可控硅的好坏
频率出错	-F 05	检查电源频率
参数出错	-F 06	重新开机或重新输入出厂数据
起动过流	-F 07	负载太重起动电流超出500%倍
运行过流	-F 08	修改设置参数减轻负载
输出缺相	-F 09	检查进线和出电缆

只有按RST复位键解除故障状态才能重新开机。

9、软起动控制模式

⑴、限流型

可使电动机在起动时最大不超过预先设定的限流值Im，Im可根据用户电网容及电动机负载情况而定，该值的设定范围在电动机额定电流Ie的1.5～5.0倍之间选择。（见图9.1）

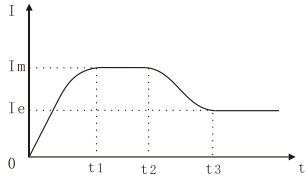
⑵、电压斜坡起动模式

电压斜坡起动方式是通过设定电动机的输入电压的上升速率来完成电动机的志动过程，由于电压从初始值到额定值上线变化（初始值可保证电动机的最大动力矩），所以整个起动过程保证电动机的平稳的起动，该值的设下范围在电动机额定电压Ue的30%～80%之间选择。（见图9.2）

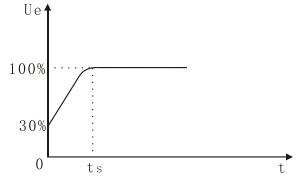
⑶、停车方式及曲线

①自由停车：靠负载惯性自由停车。

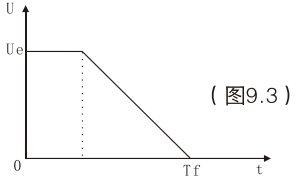
②软停车： 在有些场合，并不希望电动机突然停止，如皮带机、升降机等采用软停机方式，在发出停车信号时电动机端电压端电压逐渐减小（由功能码2设定），实现软停机目的。（见图9.3）



（图9.1）



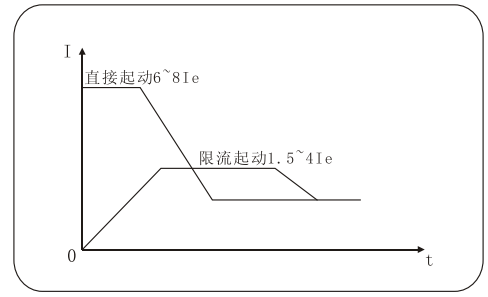
（图9.2）



（图9.3）

t

⑷、不同起动方式的电流波形比较



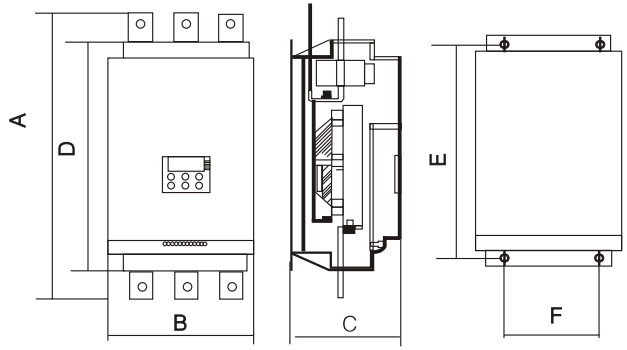
10、结构特点

自然风冷对开关柜不需要加机械排风，对电器布置无特殊要求。

⑴、主接线方式

◆ 模块型HJR2000系列均为三进线六出线。

2、结构尺寸



规格型号	功率（KW）	额定电流（A）	外形尺寸（mm）				安装尺寸（mm）		安装孔径	重量（kg）
			A	B	C	D	E	F		
HJR205.5~2022	5.5~22	10~40	237	131	150	181	200	119	Φ6	2.3
HJR2030	30	54	237	131	150	181	200	119	Φ6	2.5
HJR2037	37	68	237	131	150	181	200	119	Φ6	2.5
HJR2045	45	80	270	153	161	196	219	140	Φ6	3.8
HJR2055	55	100	270	153	161	196	219	140	Φ6	3.8
HJR2075	75	135	530	260	195	410	380	230	Φ9	17
HJR2090	90	160	530	260	195	410	380	230	Φ9	17
HJR2115	115	200	530	260	195	410	380	230	Φ9	17
HJR2132	132	250	530	260	195	410	380	230	Φ9	17
HJR2160	160	300	530	260	195	410	380	230	Φ9	17
HJR2200	200	360	575	290	195	440	410	260	Φ9	21.5
HJR2250	250	450	575	290	195	440	410	260	Φ9	21.5
HJR2320	320	560	575	290	195	440	410	260	Φ9	22
HJR2400	400	800	670	438	273	485	525	352	Φ12	40
HJR2500	500	1000	670	438	273	485	525	352	Φ12	40

附表一

主要技术参数：

电动机功率（400V时）/kw	5.5~500kw
额定工作电流Ie/A	10~1000
额定工作电压/V	~380V(-15%~10%)
频率/HZ	50HZ
持续工作电流/A	115%Ie
额定控制电压/A	AC220V~240V/50Hz
环境温度/℃	30℃/55℃

附表二

应用场合（供用户参数）

机械类型	负载类型	负载类型		起动模式		起始时间（S）	
			电流	电压	电流		
离心泵	标准负载		•		250		
风机	偏重型负载	•		55			15
压缩机（活塞式）	标准负载		•		300		
压缩机（离心式）	标准负载	•		45			12
运输机	标准负载		•		250		
搅拌机	标准负载		•		350		
球磨机	重型负载	•		50			20
轧碎机	重型负载		•		400		

根据用户现场负载大小给予设定。

故障处理：

1、无起动信号时电动机发出嗡震动：
检查可控硅或模块可能击穿损坏，旁路接触器是否处在闭合位置。

2、电机不起动需检查：
1）端子12和13接通工作电压
2）起动信号是否正常（在端子10和8之间电路闭合，端子10和9之间电路是否闭合）
3）检查起动和停止信号不应同时发出
4）电源频率是否正常
5）主电源是否连接于端子RST上
6）检查全部的连线
7）复位、施加停止信号或切断端子12和13的电压
8）软起动器是否过热？如果过热即使在复位后故障依然会存在
9）外部故障输入是否开路？如使用热过载保护继电器检查是否脱扣
10）如果故障发生在起动信号发出60～70秒软起动器试图升压但未成功，则检查所有的接线（复位，施加停止信号可切断端子12和13的电压）

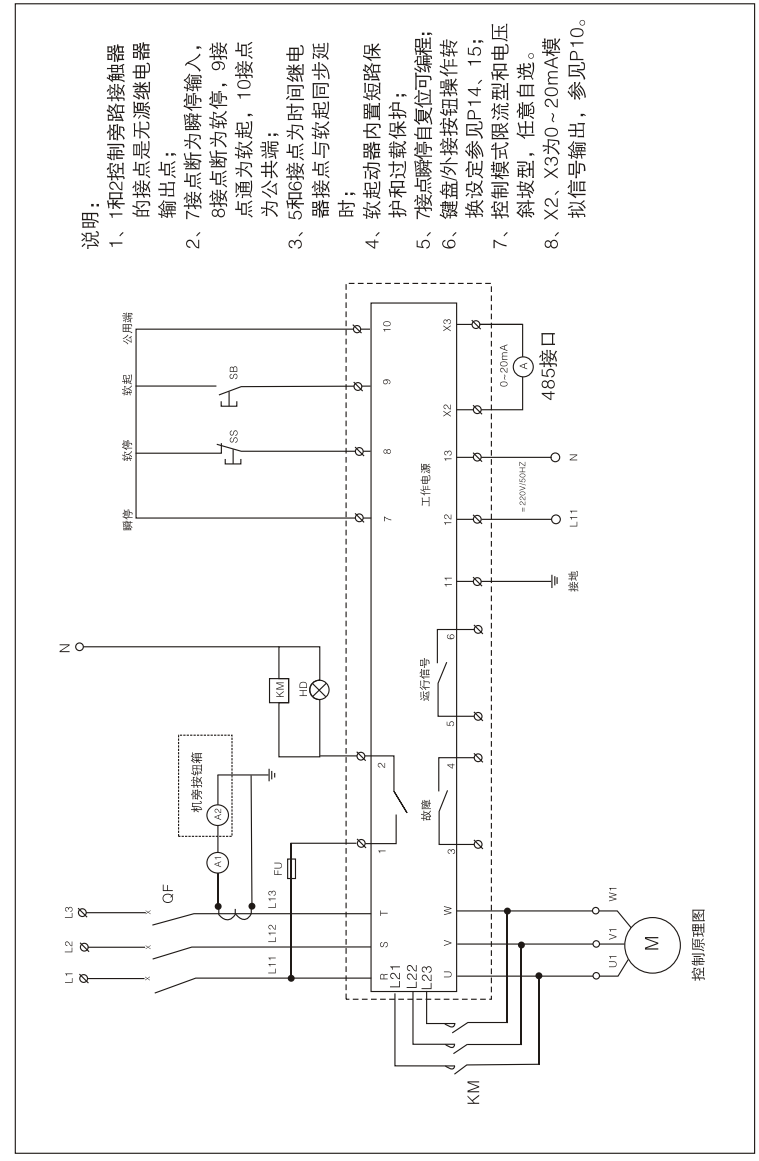
3、连续运行时电机停止：
1）主电路是否缺相？断路器是否脱扣及打开主接触器，熔断器是否熔断，检查全部的连接复位离加停止或切断端子12和13的电压。
2）停车故障。旁路接触器是已关在闭合位置上，复位同时施加起动和停止信号或者切断12和13的电压，检查负载缺相及连接。

4、在起动和运行过程中由有机声响异常：
电压过低需用小电流可参见有关技术数据，旁路接触不良，电源端或负载端是否缺相，检查接线。

5、在停车时电机声响异常或停车过程完成过早。试用不同的停顿时间（为获得理想效果可能要作多次调整，电源端或负载端是否缺相检查接线）。

6、限流功能不可调节：检查功能码04与08设定值。电机与软起动器是否匹配。

CHXL®



Safety clauses

Warning
Only specialist is allowed to install HJR.

Warning
To be sure the motor is well matched with the HJR.
During mounting the procedure shall be completely in accordancewith this MANUAL's requirements.

Warning
The intput terminals(R,S,T)mustn't be connected with the output terminals(U ,V,W)

Warning
The output terminals(U、V、W)shan't be loaded with the capacitors, otherwise the starter may be damaged.

Warning
After finshing the connection the connectors shall be sealed with insulating glue.

Warning
If remote control is put into use the local keyboard must be locked.

Warning
The enclosure of starter must be fixedly earthed.

Warning
During maintenance and repair,the input must be power off.

Preparation before installation

Before using the device please carefully read this MANUAL, otherwise,if actingagainst the clauses in this MANUAL,it may do influence with the starter operation.

Preparation before installation

Such kits as screwdriver,wire skin cuter(pincer),spanner etc, must be provided.

Warning!Before installing, please read Safety Clauses listed in III page.

Applicable Condltions

【Input Source】	AC380V ± 15%(660V)50/60HZ
【Motor Matched】	3–phase squirrel–case asynchronous motor
【Operating Frequency】	Not more than 12 times per hour
【Cooling Mode】	Naturally wind colling
【Ambient temperature】	–30℃~55℃
【Related Humidity】	90%without frosting
【Operating Site】	well ventilating and indoor without corrosive gas and conductive dusts
【Standard vibration】	withstand maximum0.5G acceleration speed while altitude below 3000m.

1 General

The AC mousecage–like asynchronous generatoris widely used in the electrical field .The application of its soft starter intelligence technology improves the starting device's identi–cal over loading,reducing impulse to network,with stable wor–king performances.he HJR series wholly–digital type soft sta–rter, Ltd,5.5–500kw,with complete indicating function LED, friendly peoplemachine talking interface and green environm–ental controlling unit KGL,is widely used in the fields,like che–mistry, building,cement,mine,environmentalprotection,etc.It is an ideal product to takethe place of the traditional product.

HJR series digital soft starters on the basis of 16–bit singl–echip controlling heavy power transistors part are provided several modes to operate:torquecontrol to soft start,current limit to soft start,nominal voltage to start,double inclined wave to soft start, soft stop. Settings can be determined in accord–ance with load, the starters have the protection functions of overcurrent,overload and phase failure etc. output voltage will rise up in compliance with sett–ing rule, which it mean the torque will increase in preconcerted way and thento well soft start the motor, after finishing starting ,transistor circuit is bypass and the main contactor is put into use.

Features of HJR series starters:

◆ Adopt 16–bit singlechip to automatically digital control

◆ Current,voltage,and starting time can be easy to be set in accordance with various load for attaining the lowest current surge and best torque control.

◆ With the smoothly and gradually starting,there can decrease the currnet surge to electrical network, lighten the vibration of equipment and lessen the noise level,prolong the life of driving system and improve the working conditions.

◆ Starting current is able to be adjusted according to load for the purpose of reduce the startup loss,in a word,getting best torque with small current as possible.

◆ Soft stop can result in extending the contacts'life and meet with some other requirements as well.

◆ Over current,overload and phase failure protections enforce the equipment and motor safe.

◆ Outer links offer several functions:digital delay starting,soft stop inputting,startup delay relay outputting,and fault relay outputting.

◆ Phase sequence can be self–checked and phase sequence protection is provided.

◆ Free stop and soft stop are possible and the time of soft st–opping can be set.

◆Fully digital settings and remote control make user operating easy.

◆ Provided with standard RS232Clink

◆ Standard analog signal output:4~20mA

◆ Merits:new designation;small volume;secure performances; ease to install and operate.

◆ Double sources separated prevent the controlled parts being big electricity interfered.

Applicable examples:

■ water pump:To control water pump.During and stopping, hammer phenomena resulted from flow impact,in finalsaving the cost of maintenance and repair to the system.

■ Ball Grinding Machine: To start by double inclined wave voltage,decreasing the loss of wheel torque and reduce the maintenance service,certainly which will lead to save cost and time.

■ Wind Machine: To use soft starter instead of conventional one, lightening the abrasion of belt and mechanical impact, Finally saving the maintenance fee.

■ Compressor:To start by current limit or double inclined wave, perform the smooth start to lessen the motor radiation and prolong the electrical life.

■ Crusher:To use block rotating and instantaneous protection, to avoid mechanical fault and block which may result in motor over heating and being burnt.

■ Sending Machine:To soft start by preconcerted way,let the machine smoothly and gradually run to avoid sent goods moving and fluid overflowing.

2 Checking during user's buuying

Do inspections as follows while opening package.

(1).Reading the namepllate,to make sure if it is the right goods you bought.

CHXL® SOFT STARTER
TYPE: HJR XXX
STANDARD: IEC947-4-2 VOLTAGE: AC380V
PRODUCTION: NO.
PRODUCTION DATE:

(2).TYPE INTRODUCTON:

HJR □ □□□
- □□□ Symbol of motor power
- □ Series number
- HJR Type

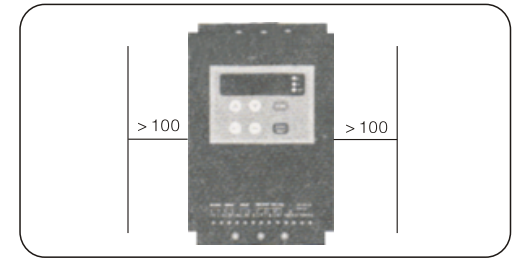
3 Installation

(1).Installation angle

In order to well cool,the soft starter must be vertically mounted.

(2). Space

For attaining well radiating,soft starter need enough room as following drawing.



4 Circuit Connection

(1).Main Circuit

Terminal Marks	Terminal performance	Remarks
RST	Input of main circuit	Connect to main circuit
UVW	Output of starter	L21 L22 L23 connect by-pass U、V、W Connect to motor
E	Earthing terminal	Metal frame earthed to prevent electrical shock and interference

(2).Control Terminals

Terminals marks	Terminal Performance	Remarks
1 2	the bypass relay terminal	can switch to the bypass contact after start completed
3 4	fault output terminal	In case of faultclosed.
5 6	Operating output signal	After startup and delaying closed
7	Input of instantaneous stop	Switch off together with04 terminal to let motor instantaneously stop
8	Input of soft stop	Switch off together with04 terminal to perform motor soft stop
9	Input of startup	Switch off together with 04 terminal to run motor
10	Public terminal for input	Public connecting terminal
1	Earthing terminal	Function ground connection
12 13	control power input	can connect to 220VDC power source

Note:The capacity of output relay contact is 3A,220VAC

(3).The Connection of Control Circuit Terminals

①Preparation before Connecting

◆ If user adopts the outer terminals,there shall be leaded from downward terminal block by screened wire.

◆ For avoiding radio interference, control wire shall be located far from motor cable and other big current cables,in case that it is not able to avoid,there shall pass vertically over each other.

②Connecting of outer control terminals

◆ Signal relay for indication of completed start ramp By-pass, Terminals 1and 2(See picture.4.1)

The built in contact is closed when the start ramp is compl–eted,To closing By–pass contector and opened.When a stop signal is given.

※Connecting a couple of resistor–capacitace whith coin of contector isbeneficiial to absorb votage shock from swtch–off. Reduce interfere to microcomputer

◆ Signal relay for fault BREAKE,Terminals 3 and 4

The built in contact gives signal at fault(normally open contact).

Technical data:max 250V/1.5A,AC–15

◆ interlocking delay–action relay 5,6 terminal

it comprise a open junction,which become closed after start delay(set it by function code 5)

technical specification AC 250V 5A

◆ input of instantaneous stop EMS,Terminals7

It is a exterior fault signal input,and can be used for exterior.

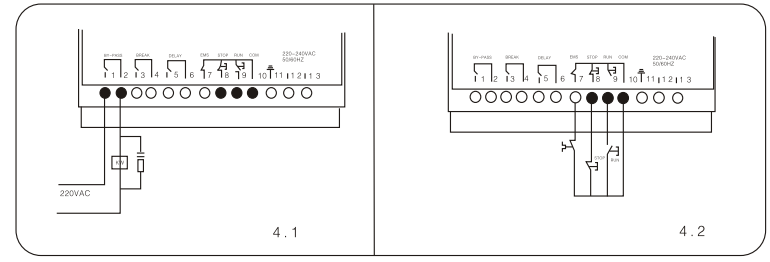
In running state,this terminal must be connected with terminal 10,otherwise,motor will stop.In order to use this function,you should set the value of function code 6 to 0,value 1will inhibit this function.

If function code is 7,you muse press panel reset knob to start, if the code is 0,it will reset automatic,you need only to connect EMS terminal again.

◆ 3–wire cotrol mode Terminals 8(STOP) Terminals 9 (RUN) Terminals10(COM)

This mode is used for outer buttons of running and stopping (Seepicture.4.2)

function code 9 is regarded as 2and 3,so this function is applicable.



◆ 2-wire control mode

A.fuser wants to use one switch to stop or start the starter or by PC,PLC to control,so the J key provided can be closed to start and pened to stop.(See picture .4.3).

B. function code 9 is regarded as 2

C. In fault state,you can reset by the keyboard or switch J.

D. Delay to Startup

In some cases that it needs delay(t) to soft startup,so this function is applicable.(Function code 07 is set as delay value) When9–10 is closed and it counts down to zero so the starter is soft startup.

◆ Ground terminal 11;

If the base plate is grounded,it can be connect to base plate at near point.

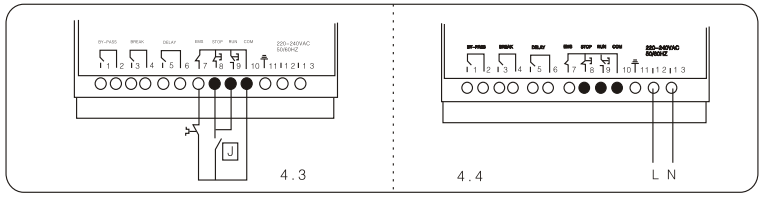
In case of Great than 90KW,the case is grounded,this terminal can open.

◆ Supply voltage,terminals 12and 13

Connect neutral and phase to terminal 12and 13.

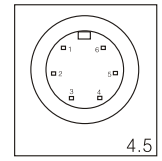
(See picture4.4)

Can also obtain by a offline transformer from main circuit



※Check that you have the correct supply voltage US.

③ communication port and anatog signal output (see figure 4.5)



Note:
the connect wire from this plug must be shield cable

◆ Standard RS 485 series link is used to connect to upper PC communication for not only to control soft start and stop ,but to monitor working current and fault states etc.

Terminal4:Receiver input and driver output

Terminal5;signal ground

Terminal6:Receiver non input and driver non output

◆ Several PC are series communicating,quantity of subcom–puters at maximum reaches up to 60pcs.

◆ Maximum transferring distance is 11m.

◆ About communicating software,please negotiate with our company.

◆ If to use series link, function code 9 shall be set as 4&5&6 and C set as its address(0–30).

◆ 0-20mA analog current signal output (only 2XXX series)

Terminal X1 output current positive pole,terminalX2 output current negative pole.

This signal is used to show motor current mainly,and send to control center.

Motor current can be obtained from analog current signal by below equation.

$Y\% = D/20 \times I \times \%$ Y:motor current(%)

D:Scale,130–when function code A equals 1,to monitor motor start.

400–when function code A equals 0,to monitor motor run.

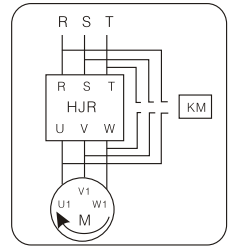
(4).Main circuit connection

Sfot starter has terminal, connect to R、S、 T terminals thro–ugh an air circuit breaker(no requirements for phase sequence). E terminals must be fixedly earthed,U,V,W as output terminals are connected to motor.After have a try, it is able to interchan–ge two wires among input terminals(R、S、T)or output terminals (U、V、W)to change motor rotating direction.

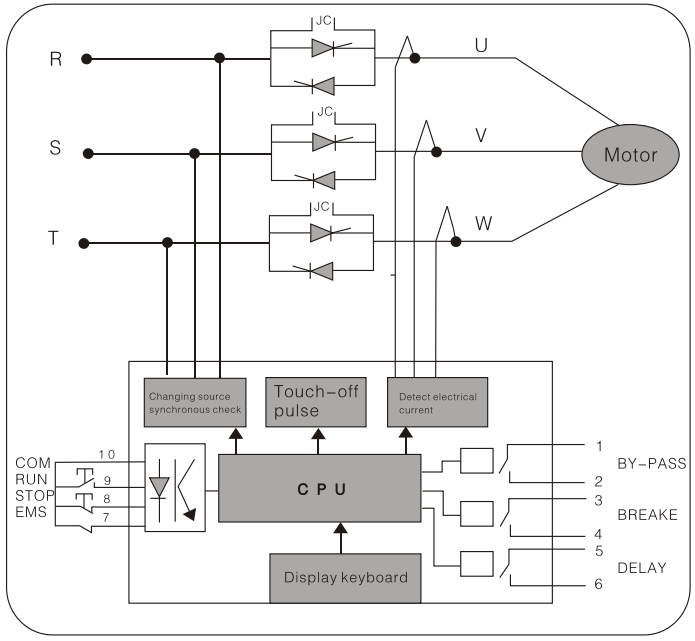
NOTLCE:

1.Not connect input terminals to output ones

2.Output terminals can't be connected to capacitors.

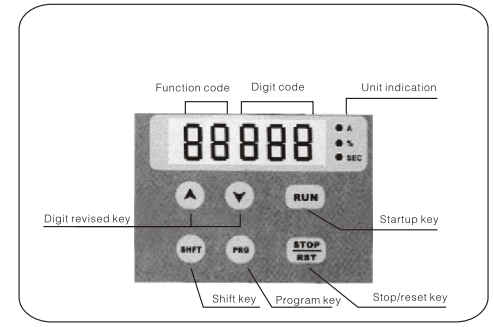


(5).circuit diagram and terminals



5Keyboard and display instruction

(1).HJR starter has five–digit display and eight control keys as following drawing:



RUN-startup key In the ready position,press the key to startup the motor

STOP/RST-Stop/reset key press this key to stop the mo–tor,reset key if press this key in case of programming or fault,it will come back to the Λready state.

PRG-Program key "READY"mean it is under ready r state, press this key to enter into sub programming, after changing the value if press this key so it will save the value.

SHFT-shift key during programming, press this key to enter into the state of revising value or exit revising state.

Λ,V-Acceleration key Press one of the keys to change value quicker.In the ready state,press this key to reset as ex–factory values.

(2).Display and Instruction

Functions		Setting range	Ex-factory setting	Remarks
code	Description			
0	Startup voltage	30~80%	30%	Voltage(torque)mode valid
1	Starting rise-up time	0~60S	10S	Voltage(torque)mode valid
2	Soft stop time	0~60S	2S	If setting is 0,it means free stop.
3	Startup delay	0~240S	0S	2-wire control mode valid
4	Startup limit current	150~400%	250%	current limit mode,torque control is valid
5	Interlocking delay	0~240S	0S	
6	instantaneous stop	0~1	0	0:with; 1:without
7	Instantaneous stop &startup allowable	0~1	0	0:allow 1:Forbid
8	Control mode	0~1	1	0:current limit 1:voltage
9	Control mode	1~6	1	1:keyboard, 2:outer control(remote) 3:outer shift, 4:PC, 5:PC+keyboard, 6:PC+outer control
A	0~20mA	0~1	0	
B	Display mode	0~132	0	0:according to percent rated current XXX: select actual rated power
C	Address	0~30	0	For series link of communication
D	Value set protection	0~1	0	0:allow to revise 1:forbid revise value
E	Over load times	50~200%	150%	
F	Phase lose	0~1	0	0:no 1:yes
EY	Revised value protection	Under this state,it is allowed to change value		
A	Startup rising state	1.Display working current(XXXA)or percent rated current 2.Time display of delay startup		
-A	Running state			
-A	Soft stop state			

NB:X stand for 0~9,Y stand for 0~F digits

Note:even if in voltage mode,the current limited is still active and its upper value is 400%

(3).Structure and working principles:

①Structure type

With the starting mode of current-limiting voltage slope,LED indicating poles,simple function parameter design and standard Rs486 connector,can be communicated with PC,It can control soft starting,soft braking and monitor working current and

fault. Has 4~20mA analogue signal output for controlling center to monitor working current with the protecting function of over-loading and power phase-lack.The wiring mode,threein and three-out,is simple.

②Working principles and characteristics:

HJR series asynchronous generator soft starter adopts SCR power assembly Double-chip as its controlling nucleus, and its working principle is as follows:(see the attached diagram) HJR series asynchronous generator soft starter adopts three pairs of non-parallel connection transistor, series connected with three-phase circuit,to control its soft starting by controlling voltage using the characteristic of transistor, when starting finishes and reaches its rated voltage,the asynchronous generator' contact KM is closed to start it.All kinds of starting parameter can be set because of double-chip for controlling,so it is suitable for every loading.

6 Value setting

(1).If value set is los,if will display "-F06",do revise in accordance with the following procedure.

①turn off the control power source

②press"PRG"key

③Turn on the power then release PRGkey,the all setup data will be replace by the factory value.

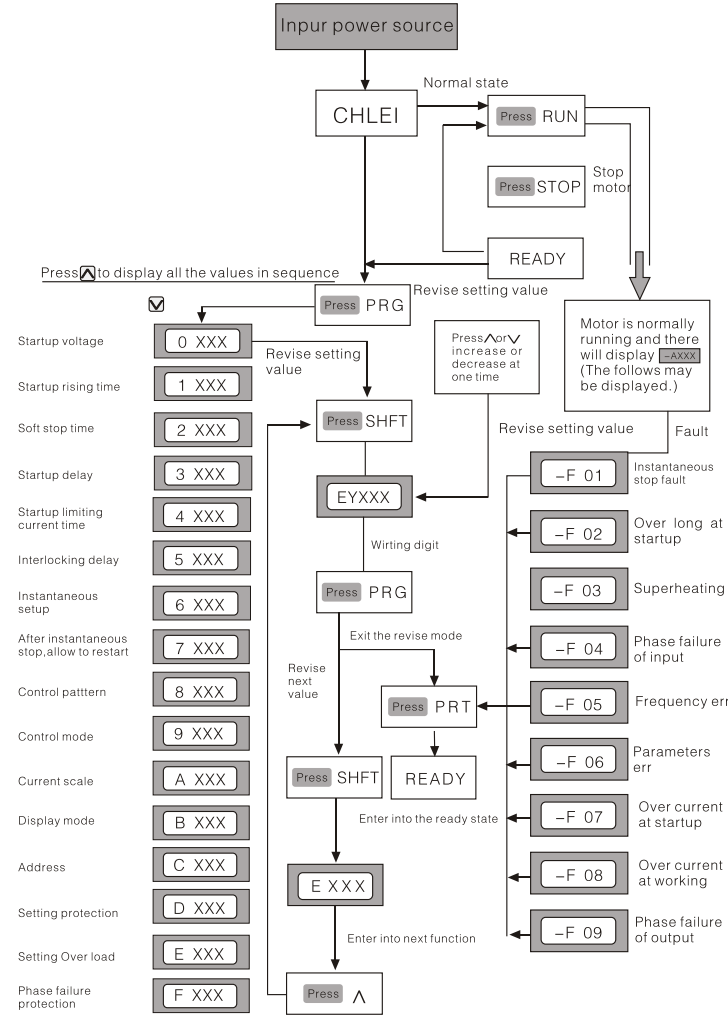
(2).Even if power off all of sudden,the setting are kept safely till boing revised nest time.

(3).When ex–factory settings are not meeting with your require ments, do revise in accordance with the following procedure (examples of revises starting limot current and control mode)

① The operation steps as below

NO	Operstion	Display	Remarks
1		CHLEI	Display contents after switching on
		READY	Ready state after resetting
2	Press"PRG"key	0 XXX	Ready state of programming
3	Press"Λ"four times	4250	factory value 250%
4	Press"SHFT"key	E4250	State of revising value
5	Press"Λ"five times	E4300	Increase value
6	Press"PRG"key	GOOD	Keep revised values
7	Press"SHFT"key	4300	Return to the programming state
8	Press"Λ"five times	9 1	Ready to revise next value
9	Press"SHFT"key	E9 1	Repeat
10	Press"Λ"one times	E9 2	Repeat
11	Press"PRG"key	GOOD	Repeat
12	Press"STOP/RST"key	READY	Return to startup state

②Working state and Opersting sequence



NB:X stand for changeable value from 0~9,Y stand for~F function code.

7 Electrify to run

After finishing the above connection,do following procedures.

(1).Have a try to run

This action makes mainly sure that if the rotation direction and motor driving are normal.

◆ Switching on the air circuit breaker,if under normal state there shall display CHLEI.

◆ Control mode shall be set as 1,startup voltage and startup time may not be changed and keep ex-factory values.

◆ According to the actual load there shall set appropriate soft starter values for attaining the best state of torque.

◆ Press RUN key to inspect the motor rotation direction if it meet with therequirement,if showing abnormal phenomena it is able to press STOP during the startup time.

◆ If the torque is not enough,if want to watch longer and curr-ent limit value,increase the motor torque

(2).Run

◆ Referring to the data of the attached table1

◆ Press RUN key on the keyboard,in case of outer control it is by signals starter is beginning to run,motor is steadily accel-erating to rotate and current show no chopping, these mean values set are reasonable.

◆ During running,it may press STOP key (or outer stop signal) to cease motor running.

◆ If user wants to display the real working current,please set function code 0B as the rated power of this starter.

◆ If ambient temperature is less than 10 degree,it shall preh-eat more than 30 minutes.

8 Protection Display Introduction

HJR series starters have been provided with such several protections. If it happens to any fault there will cease motor and display the fault codes.

Protection items	Display contents	Protecting actions
Instantaneous stop	-F 01	instant stop terminal 7and 10 become open
Over long of startup time	-F 02	Current limit is too low,which result in long startup time(more than 100s)
Superheating	-F 03	start times is too more,to decrease the start times
Phase failureof input	-F 04	check the power input,motor connect wire and thyristor
Frequency err	-F 05	check the frequency of power source
Parameterserr	-F 06	switch on again or input factory data
Over current at startup	-F 07	the load is too heavy that start current exceed 500%(2XXX series)
Over current at working	-F 08	modify the parameter to alleviate load (2XXX series)
Phase failure of output	-F 09	check the input and output connected wire (2XXX series)

Only after pressing RST key to clear off fault state there can restart.

9 Starting Mode

(1).Limiting current type

Limiting the starting current,step-down starting voltage and being rectified as you wish by keyboard.(See picture 9.1)

(2).Voltage slope starting mode:

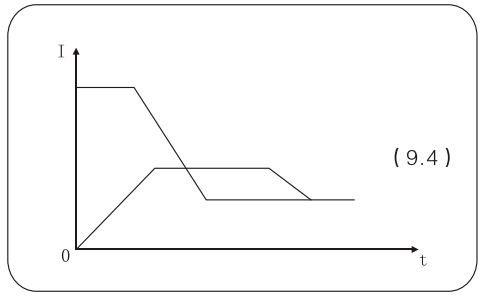
if achieves by the means of rising rate by setting input voltage. Because of the rising change from original to rated value,the generator can start steadily. The value is set between rated voltage Ue 30%-80%(see picture 9.2)

(3).Stopping modes:(see picture 9.3)

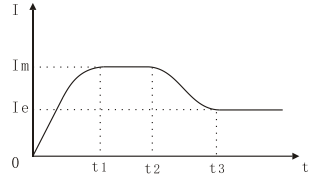
a.free stoping:by the means of loading inertia.

b.soft stopping:by the means of its voltage reducing gradually given the stopping signal,The mode applies for some situations where the generator is not expected to stop suddenly, such as conveyer,lift ,etc.

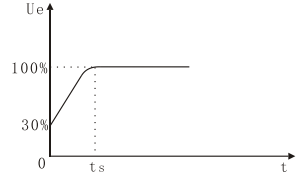
(4).compare respectively to the various waves of several startup modes .(see picture 9.4)



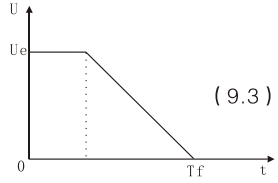
(9.4)



(9.1)



(9.2)



(9.3)

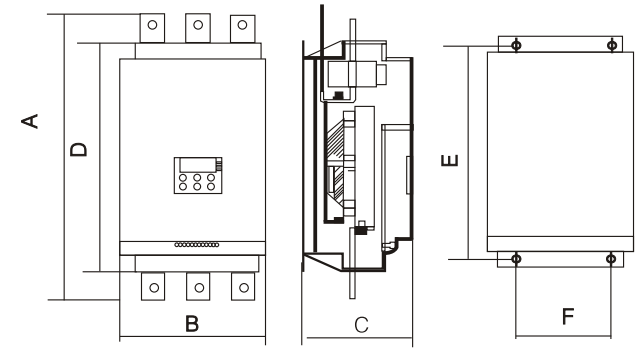
10 Structrue Character

By natural breeze cooling,the switch cabinet needs not air draft with machine equipment;to the electrical equipment disposal, no special request needed.

(1).nnection mode

◆ For module type HJR2000 series,three lines enter on the top and six lines come out underside.

(2).Struct size



Specification and type	Power (kw)	Rated current	Figure size(mm)				Setting size(mm)		Setting aperture	(Kg)
			A	B	C	D				
HJR205.5~2022	5.5~22	10~40	237	131	150	181	200	119	Φ6	2.3
HJR2030	30	54	237	131	150	181	200	119	Φ6	2.5
HJR2037	37	68	237	131	150	181	200	119	Φ6	2.5
HJR2045	45	80	270	153	161	196	219	140	Φ6	3.8
HJR2055	55	100	270	153	161	196	219	140	Φ6	3.8
HJR2075	75	135	530	260	195	410	380	230	Φ9	17
HJR2090	90	160	530	260	195	410	380	230	Φ9	17
HJR2115	115	200	530	260	195	410	380	230	Φ9	17
HJR2132	132	250	530	260	195	410	380	230	Φ9	17
HJR2160	160	300	530	260	195	410	380	230	Φ9	17
HJR2200	200	360	575	290	195	440	410	260	Φ9	21.5
HJR2250	250	450	575	290	195	440	410	260	Φ9	21.5
HJR2320	320	560	575	290	195	440	410	260	Φ9	22
HJR2400	400	800	670	438	273	485	525	352	Φ12	40
HJR2500	500	1000	670	438	273	485	525	352	Φ12	40

Attached form 1

Main technique parameter:

The generator working power(400v per hour)	5.5~500
rated working current	10~1000
rated working voltage	~380V(−15%~10%)
Frequency	50HZ
continuous working current	115%Ie
rated controllling voltage	AC220V/50HZ
Environmental temperature	−30℃/55℃(adjust able)

Fault handling

1.The generator shakes without starting signal.Check whether the controllable silicon or module is damaged by striking,and whether by −pass contact is closed.

2.Be sure to check the following problem if the generator won't start

1).The terminal 11and 12are connected with working voltage.

2).The starting signal is in a normal state (The circuit should be closed between the terminal 7and 8,the terminal 7and 9.)

3).The starting signal and stopping signal should not sound at the same time.

4).Normal power frequency.

5).The main power is connected to the terminal RST.

6).Check all the wires

7).Reset,give stopping signal or cut off the voltage of the ter−minal 11 and 12.

8).Check whether the soft starter is over−heated.If so,the fault remains after Resetting

9).Check whether outer fault inputting is open. If using heat overloading protective relay,you should check if it is tripped.

10).If the fault started fails to increase voltage after the starting signal has been gives for 60−70 seconds,please check all the wires(Reset,give stopping signal or cut off the voltage of the terminal 11 and 12.)

3.The generator stops when working

1).Check whether the main circuit lacks phase, the breaker is tripped,and the fuse is fused by opening the main contact.

2).stopping fault. Check whether by –pass contact is closed. Reset.give stopping signal or cut off the voltage of the terminal 11and 12.Check loading phase–lack and wiring.

4.The generator sounds unusually when staring or working if the voltage is too low,you should adopt small current turning to technical parameter for help.Check whether by–pass contact is connected well, power or loading lacks phase and wiring.

5.If the generator sounds unusually or the stopping completes too early,please try using different pause time.(several adjus–tments are allowed to gain ideal results.)

6.The limiting current is not adjustable:check the switch used for setting ILIM parameter is in the blue range and the genera–tor matches the soft starter.

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